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ABSTRACT

Questioning and Understanding To Improve Learning and Thinking (QUILT) was designed to increase teacher use of effective classroom questioning techniques and procedures across all grade levels (K-12) and subject areas. QUILT offers faculty the opportunity to focus on the process of effective questioning for a full year and features a process for professional growth and development that incorporates individual reflection, collegial support, a classroom focus, a program for school renewal that can facilitate systemic change, and a paradigm for staff development that builds site-based capacity. A field test was conducted in which some teachers received a full QUILT program, others received only an 18-hour induction training, and others received a 3-hour presentation on classroom questioning. Data were collected from the more than 1,100 teachers in 13 districts. Results showed QUILT to be an effective approach to improving questioning skills of participants. Teachers who received the full QUILT program had significantly higher levels of knowledge about questioning and showed the impact of program training in videotaped observation of their classroom practice. (Contains 15 references.) (JB)

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QUILT: An Innovative Approach to Effective Instructional Improvement

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Questioning and Understanding to Improve Learning and Thinking (QUILT) is a program designed to increase teacher use of effective classroom questioning techniques and procedures across all grade levels (K-12) and subject areas. The purposes of this paper are to: (1) describe the QUILT staff development program and relate it to current research findings on staff development and (2) to briefly summarize the research and evaluation findings of the QUILT field testing.

The QUILT Staff Development Design

QUILT is a program of the Appalachia Educational Laboratory, Inc., Charleston, WV. It offers the opportunity for an entire faculty to focus their growth and development for a full year upon the process of effective questioning, which is central to all instruction. This sets QUILT apart from many staff development programs that are piecemeal and short-term in nature. Both the content and process designs for QUILT are innovative. The content design, which draws from a very robust research base on effective questions and questioning procedures, offers teachers a pattern for interactive teaching and learning. The process design features (1) a process for professional growth and development that incorporates individual reflection, collegial support, and a classroom focus; (2) a program for school renewal that can facilitate systemic change; and (3) a paradigm for staff development that builds site-based capacity.

The content design for QUILT presents teachers with a systems view of the questioning process that integrates it with the totality of instruction and produces higher levels of student learning and thinking. This design, embodied in the QUILT model, Figure 1 (Walsh and Sattes, 1992), integrates the knowledge base on questioning and conceptualizes it in terms of teacher behaviors. This enables teachers to inquire into their own practice, using the QUILT model as a frame of reference, thereby providing an opportunity for "reflective practice" which Lieberman and Miller (1991) identify as being critical to successful staff development. Furthermore, the QUILT content design, with its emphasis on student-teacher interactions, moves beyond the simple process/product conceptions of teaching and learning and views questioning/responding/reacting as complex sets of behaviors that are constantly interacting. This is consistent with current research conceptions of "teaching and learning as co-constructed by teachers and students in a particular classroom" (McLaughlin, 1991).

This view of teaching and learning as "co-constructed practice" is directly related to current conceptions of a "restructured classroom" where traditional teacher and student roles (predicated on maximum teacher control of all learning transactions) shift and students are provided both the responsibility and the skills to become accountable for their own learning (Dillon, 1988). Fullan (1991) identifies "student engagement" as the "key theme" in recent research on student classroom behavior and cites the following definitions of

The QUILT Model—Teacher Behaviors to Support Effective Classroom Questioning

Stage 1: Prepare the Question

- ♦ Identify instructional purpose
- ♦ Determine content focus
- ♦ Select cognitive level
- ♦ Consider wording and syntax

Stage 2: Present the Question

- ♦ Indicate response format
- ♦ Ask the question
- ♦ Select respondent

Stage 3: Prompt Student Responses

- ♦ Pause after asking question
- ♦ Assist nonrespondent
- ♦ Pause following student response

Stage 4: Process Student Responses

- ♦ Provide appropriate feedback
- ♦ Expand and use correct responses
- ♦ Elicit student reactions and questions

Stage 5: Critique the Questioning Episode

- ♦ Analyze the questions
- ♦ Map respondent selection
- ♦ Evaluate student response patterns
- ♦ Examine teacher and student reactions

Figure 1. The QUILT Model

engagement: "to attract and hold thorough interest," "to cause to participate," and "to connect or interlock with." The QUILT design motivates teachers to examine patterns and levels of student engagement in their classrooms and focuses upon teacher attitudes and behaviors that facilitate student engagement. The QUILT classroom (Figure 2) provides one vision of the restructured classroom and serves as a tool which teachers can use in "reflective practice." This depicts the connections that QUILT helps teachers and students make between shared values/ beliefs, teacher behaviors, student behaviors, and learning outcomes. QUILT is firmly grounded in the notion that "staff development is about human development and learning for both students and teachers" (Lieberman and Miller, 1991). This is another hallmark of cutting edge approaches to staff development.

The content of QUILT teacher and student questioning takes a holistic view of instruction and thus encourages a developmental approach to teacher growth; QUILT takes teachers where they are in their personal and professional development and nurtures individual commitments to improvement. Levine (1989) points to the importance of "interactions between self and other and individuals and their environments" in growth and development; she further concludes that meaningful adult learning results when individuals have opportunities for both personal reflection and interaction with peers. The QUILT program design attempts to optimize these two processes. Four main components comprise the program design: (1) an 18-hour "induction training" which sets the knowledge base in effective questioning, (2) a series of seven "collegiums" spread over one or more school years which afford opportunities for sharing classroom experiences related to the use of QUILT; (3) a variation on peer coaching referred to as "partnering" which involves observing and providing feedback to a colleague regarding use of specific QUILT behaviors and, in turn, being observed and receiving feedback from this colleague; and (4) and actual classroom use of QUILT behaviors (Walsh and Sattes, 1992).

The designs for the induction training and collegiums provide time for personal reflection along with a substantial number of structured group activities that facilitate meaningful interaction. Likewise, during the partnering experience and classroom use, individual teachers draw upon their interactions with peers and with their environments. This particular program design is also consistent with the findings of Joyce and Showers (1988) who have documented the importance of four basic components to any effective staff development experience: (1) provision of a knowledge base; (2) demonstration or modeling of associated skills; (3) opportunities to practice the skills; and (4) to receive feedback regarding use of skills. The QUILT program design intentionally incorporated these four components. During induction training and the seven collegiums, the knowledge base is developed and reinforced; partnering focuses upon the demonstration, practice, and feedback; and the classroom applications promote effective ongoing practice, reflection, and self-assessment.

WHAT A QUILT CLASSROOM LOOKS LIKE

SHARED BELIEFS

- Good questions help students learn.
- All students can respond to all questions.
- All students' answers deserve respect.
- Think time is important.
- Students will ask questions when confused or curious.
- All students can think and reason—beyond rote memory.
- Divergent thinking is important.
- Not all questions have one right answer.

BEHAVIORS

Teachers:

- ask clear, focused, and purposeful questions.
- ask questions at all cognitive levels.
- allow wait time I after asking.
- allow wait time II after students answer.
- give each student an equal chance to answer.
- invite and allow time for student questions.

During recitations, teachers...

- use a variety of response formats.
- give appropriate feedback.
- help students answer correctly—rephrase, prompt, and cue when needed.
- ensure that correct answers are heard by all.

During discussions, teachers...

- probe and redirect.
- encourage students to interact with other students.

Students:

- pay attention to all questions and answers.
- think of answers to all questions.
- are on alert to answer all questions aloud.
- answer questions at appropriate cognitive level.
- use wait times to think about answers.
- give wait time to others when asking questions.
- ask questions when confused.
- ask questions when curious.
- make meaning out of facts.

STUDENT OUTCOMES

In a Quilt Classroom, students:

- know facts.
- develop understandings based on facts.
- use knowledge to solve problems and make decisions.
- develop new products and ideas.
- make inferences and draw conclusions.
- hypothesize and speculate.
- know and use effective questioning skills.
  - rephrase, cue, probe, and redirect.
  - use wait times I and II.
  - give meaningful feedback.
  - ask questions at different cognitive levels.
- thoughtfully answer teacher and peer questions.
- ask many, high-quality questions.

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Figure 2. The QUILT Classroom

The design requires a substantial time commitment on the part of schools and teachers; in fact, QUILT requires a minimum one-year (and ideally a three-year) commitment on the part of adopting teachers and schools. This is consistent with theory and research which holds that "change is a process not an event" and one which involves developmental growth on the part of individuals over time (Fullan, 1991; Hord et al., 1987). Because of the requirement for collegial support, QUILT was conceived as a school-based program that would involve the entire faculty in school renewal.

Further, QUILT developers acknowledged the importance and power of culture as support for individual growth and development. QUILT: (1) encourages the development of a shared vision, the QUILT classroom; (2) provides for a common vocabulary related to effective instruction (e.g. "wait time I," "wait time II," "action zone," "educative question"); (3) uses symbols and metaphors (the metaphor of a quilt being a powerful one for this program); (4) incorporates rituals (e.g. induction, partnering, collegiums); and (5) suggests other activities related to culture-building as elaborated in Deal and Kennedy (1982). Lieberman and Miller (1991) state: "Staff development is culture building.... and should connect the renewal of schooling and the renewal of educators." They further argue that effective staff development "support[s] the development of collaborative cultures, where teachers assume new roles in their own development and in the education of their students."

One of the unique features and real strengths of QUILT relates to its commitment to such collaborative culture through the establishment of Local Facilitation Teams (LFTs), which are comprised of teachers, many of whom had never presented workshops or assumed instructional leadership roles. These teams are completely responsible for the implementation of QUILT at the local school level. These LFTs receive training, materials, and other support from the QUILT designers and developers as they plan and implement with their faculty. This is consistent with a new paradigm for staff development that builds site-based capacity. A significant factor in this delivery model is the development of a core advocacy group and building of local ownership in QUILT, both of which are important variables in successful change efforts (Fullan, 1991).

The salient features of the QUILT program coincide with key themes in current literature on staff development: individual reflection, classroom focus, collegial support, school-based, whole faculty, multi-year, peer trainers, and peer coaching. The foci of the content design (questioning, learning and thinking) are at the heart of learning and teaching. Given these characteristics, QUILT developers were anxious to test the program in the real world of schools and classrooms. Excitement about a broad-based fieldtest stemmed from the fact that most of the literature on staff development is grounded primarily in theory, not research. Hence, the research design described below is itself somewhat cutting edge in its purpose and scope. As Todnem and Warner (1994) state: "We applaud the QUILT developers

for having the courage to test their hypothesis that well-designed staff development does make a difference in teachers and students."

The QUILT Research Design

Over the past four years, QUILT has been used by more than 2000 teachers in five states. While evaluation activities have been conducted each year, during one year an extensive comparative research design strategy was conducted. QUILT was field tested using three randomly configured, group comparison configurations: condition A involved the full QUILT program including the 18-hour induction training, collegium and other activities; condition B involved only the 18-hour induction training; and condition C involved only a three-hour presentation on classroom questioning. Data were collected pre and post for all three groups, which included more than 1100 teachers in 13 school districts from four states. Changes on questioning behaviors were compared across the three groups. Dependent variables included teacher knowledge, teacher and student attitudes, and several observable behaviors, collected using videotapes which were coded by coders trained to record classroom questioning behaviors. In addition, QUILT teachers provided perceptions of effectiveness of training and ongoing activities, including the collegium and partnering activities.

Results of the QUILT Fieldtest

A summary of the primary results from the fieldtest are presented here. More extensive descriptions of the instruments used, data analysis methods, and these results, including tables, are found in other references (Barnette and Sattes, 1991; Barnette, et al., 1992a; Barnette, et al. 1992b; Barnette, et al. 1993; and Barnette, et al., in press).

Induction Training Evaluation

At the start of the fieldtest year, induction training was conducted in all 13 sites by teachers and administrators trained in the use of the QUILT model, trained in training procedures, and provided with QUILT training materials. There was a concern that all three groups get effective training. The major difference between the comparison groups which was the basis for treatment differences was the extent of use of many factors related to effective staff development not just the induction activities. It was desired that all three conditions receive effective training. Training sessions were evaluated using a 15-item, 1 (not at all) to 5 (very much), Likert-type survey. Participants in all three induction training conditions rated all aspects of the training very favorably (all item means were 4.0 or above on all 15 items). The six items rated most positively by the total group were, the session: was conducted in a professional manner, was conducted in a positive climate, was

conducted by a competent trainer, caused me to reflect on my practices, had clear objectives, and had meaningful involvement of participants. There were no significant differences between the three comparison groups relative to perceptions of the on-site induction training sessions.

Teacher Knowledge

The QUILT consultants and staff developed an instrument to assess teacher knowledge of effective classroom questioning practices. It includes six subscales: effective questioning, teacher feedback and reaction, discussion vs. recitation, respondent selection/response format, cognitive levels, and wait time. This was given pre and post to all three QUILT conditions. There were significant pre to post mean changes within condition A on all six subscales and the total score at $p < 0.001$. The effect sizes ranged from 0.36 to 1.30 on the subscales and was 1.17 on the total score for condition A. The subscales with the highest effect sizes were: wait-time (1.30), cognitive levels (0.73), and effective questioning (0.61).

There were significant pre to post mean differences on all subscales and the total score for condition B. Effect sizes ranged from 0.16 to 0.89 on the subscales and was 0.64 for the total score for condition B. There were significant differences on four of the subscales and for the total score for condition C. Effect sizes for condition C ranged from -0.08 to 0.46 on the subscales and was 0.24 for the total score.

When comparing condition A posttest means with the posttest means of the other two groups, condition A had significantly higher means than both conditions B and C on the total score. Condition A was significantly higher than condition B on three of the subscales and was significantly higher than condition C on all six subscales. When comparing the pre to post change, there was significantly higher change for condition A on three of the subscales and the total score compared with condition B, and significantly higher pre to post change on all subscales and the total score compared with condition C.

Teacher Attitude

A 50-item Likert-type survey instrument was developed by QUILT consultants and staff to assess attitudes of teachers toward classroom questioning practices. This was given pre and post to all three QUILT conditions. Attitudes toward classroom questioning were positive at both observation times (about a mean of 3.0 on a 1-4 point scale). There were no pre to post significant differences for any of the three groups.

Student Attitude

A 57-item Likert-type survey instrument was developed by

QUILT consultants and staff to assess attitudes of students toward classroom questioning practices. This was given pre and post to randomly selected classes of students from all three QUILT conditions. Attitudes toward classroom questioning were positive at both observation times (about a mean of 2.8 on a 1-4 point scale). There were no pre to post significant differences for any of the three groups.

Classroom Observation

A ten-percent random sample of teachers from each condition was selected for classroom videotaping prior to QUILT induction training and then at the end of the first year of QUILT implementation. Videotapes were coded by trained coders who looked for specific classroom behaviors. Twelve variables were examined from the observation data. These, with the desired direction of change indicated in parentheses, were: number of teacher questions (decrease), mean wait time I in seconds (increase), percent of questioning episodes with zero wait time I (decrease), percent of questioning episodes with three or more seconds of wait time I (increase), mean wait time II in seconds (increase), percent of questioning episodes with zero wait time II (decrease), percent of questioning episodes with three or more seconds of wait time II (increase), percent of teacher questions at higher than recall cognitive level (increase), percent of student answers at higher than recall level (increase), percent of questioning episodes where teacher redirects question to another student (increase), percent of questioning episodes where teacher designates the student to answer after asking the question (increase), and percent of questioning episodes where the teacher immediately repeats the student's answer (decrease).

For condition A, all of the variables had effect sizes of 0.4 or greater in the desired direction, with eight having effect sizes greater than 0.5. There were statistically significant pre to post differences at $p < 0.05$ on all twelve variables for condition A. For condition B, there were five variables with effect sizes greater than 0.5 and significant pre to post differences on five of the variables. There was only one significant pre to post difference for condition C.

At the posttest, there were significant differences between the condition A mean and condition C mean on seven of the variables and condition A was significantly different than condition B on five of the variables. These differences were all in favor of condition A.

In addition, there were significantly higher changes between pre and posttest means for condition A compared with condition C. These variables were: mean wait time I, percentage of wait time I at three seconds or higher, on all three variables associated with wait time II, and on percentage of time the teacher redirected the question to other student(s).

Participant Feedback

Participants in the A condition were asked to complete an end of QUILT reaction form. Results from that form indicate the extent to which QUILT collegium activities were conducted and perceptions of their value. The average number of collegiums attended was 6.5, out of seven. Participants reported being observed by another QUILT teacher an average of 4.2 times and observing another QUILT teacher 4.4 times during the school year. The two primary incentives for participation were: inservice credit hours and opportunity for professional growth and development. Only two-percent indicated their principal was not involved in the QUILT program, 60% indicated the principal actively participated, and 25% indicated that the principal provided QUILT training.

On a 1-4 scale, with 4 being highest, participants rated all of the following items at 2.9 to 3.0, I benefitted from: being observed by another QUILT participant, observing another QUILT teacher, feedback from my QUILT partner, and attending collegiums. When asked to rate aspects of participation, the highest rated aspects were: increased knowledge of classroom questioning and responding, increased skill in classroom questioning and responding, professional growth and development, networking with other educators in the school/district, and increased ability to observe and provide feedback to other teachers.

When asked to rate the QUILT facilitator or team (made up of local teachers and administrators) on a 1-5 point scale, where 5 was the highest rating, the mean response on all eight characteristics was 4.1 or greater. The characteristics ranked high to low were: worked well with other training team members, organization and management skills, sound knowledge base, skillful at climate setting, presentation skills and techniques, facilitated group discussion, adjusted to group needs, and maintained high levels of student involvement. Participants felt they were most successful in using the QUILT behaviors of: wait time I, clear wording and syntax, providing appropriate feedback, attending to equitable respondent selection, and assisting nonrespondents. Seven percent indicated QUILT was clearly the best staff development they had ever had, 40% felt it was clearly better than others, and 45% felt it was about as good as others.

Conclusions

It is the goal of the QUILT staff development program that teachers ask fewer, but better (higher cognitive level) questions, that questioning be planned and purposeful, that it stimulate higher level critical thinking, and that teachers use techniques such as wait-times I and II, probing, respondent selection, and variable response formats to increase the learning and skill development potential of questioning. Based on research established staff development practices, QUILT has been shown to be an effective approach to improving the questioning

skills of participants. QUILT participating teachers attribute the effectiveness of the QUILT program to the presence and use of factors established in the literature as being associated with effective staff development. In April 1994, QUILT received PEP approval and is now a project included in the National Diffusion Network.

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